

Shoshana Dobrow Riza and Daniel Heller **Follow your heart or your head? A** **longitudinal study of the facilitating role of** **calling and ability in the pursuit of a** **challenging career**

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Running Head: FOLLOW YOUR HEART

Follow Your Heart or Your Head?
A Longitudinal Study of the Facilitating Role of Calling and Ability in the Pursuit of a
Challenging Career

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Follow Your Heart or Your Head?

A Longitudinal Study of the Facilitating Role of Calling and Ability in the Pursuit of a Challenging Career

Abstract

While making early career decisions in which pursuing what one loves and earning a secure living are at odds with one another, when and why will the intrinsic considerations prevail over the extrinsic considerations? We posit that a key factor in resolving this dilemma in favor of the intrinsic side of the career is the sense of calling, a consuming, meaningful passion people experience toward the domain. We test the connection between early callings (in adolescence) and later career pursuit (in adulthood) and the mediating role of perceived and actual abilities (in young adulthood) in a career context in which the intrinsic and extrinsic sides of a career can clash: the path to become a professional musician. In an 11-year, five-wave longitudinal study of 450 amateur high-school musicians progressing from adolescence to adulthood, we found that regardless of their actual musical ability, people with stronger early callings were likely to perceive their abilities more favorably, which led them to pursue music professionally. Our findings thus indicate an intriguing pattern in which the experience of stronger early callings led to greater perceived ability that was *not* reflected in greater actual ability. Perceived ability, rather than objective ability as assessed by awards won in music competitions, led to subsequent career pursuit. We discuss implications for theory and research on the nature and consequences of calling, as well as for career decision making, both in general and in challenging career contexts in particular.

Keywords: Calling, ability, careers, meaning of work, longitudinal, musicians

“Everyone who chooses *not* to go into music has made the right decision. If you don’t need it, you shouldn’t do it. The desire to do music has to be coming out of you in an urgent way”.¹

During challenging economic times such as today, people face deeply conflicting options regarding what they should prioritize in their future careers. One approach to career pursuit encourages people to prioritize doing what they love and to pursue their passions, as exemplified by Steve Jobs’ statement that “the only way to do great work is to love what you do. If you haven’t found it yet, keep looking. Don’t settle” (Jobs, 2005). A second approach encourages prioritizing achieving outcomes such as salary and job security, as exemplified by the advice in a *U.S. News & World Report* article: “‘Do what you love,’ for most people, isn’t a reliable way to find the right career – and can lead to anxiety, job-hopping and dissatisfaction...So a better goal...is probably to do something that you’re good at, that brings you a reasonable amount of satisfaction, and that earns you a living” (Green, 2013). Ideally, people can follow both approaches – pursuing a career that simultaneously permits them to do something they love *and* earn a strong salary and have high job security. However, given economic realities, people commonly face trade-off decisions as they make initial career decisions that pit these two sides of careers against one another. This poses a difficult dilemma for individuals, as people typically care about both. Indeed, even as relative preferences among intrinsic and extrinsic career values vary across generations, most people nonetheless want both types of values to some degree in their careers (Twenge, Campbell, Hoffman, & Lance, 2010). In this study, we focus on understanding what impacts career-pursuit decisions when prospects of pursuing both sides of careers seem to clash.

Dating back to the 1930s, when the Chicago School of Sociology first articulated the distinctions between external, measurable versus internal, individually-experienced and

¹ Professional orchestra conductor, Personal communication, 2001.

perceived aspects of careers (e.g., Hughes, 1937), career theory has long advocated considering both sides to fully understand people's careers (Barley, 1989; Hall, 2002; Heslin, 2005; Ng, Eby, Sorensen, & Feldman, 2005). In spite of this longstanding broad view of careers, the vast majority of careers research in the second half of the 20th century focused on extrinsic characteristics (Arthur & Rousseau, 1996).² Consistent with decades of organizational psychology research highlighting the importance of various intrinsic characteristics of work, including intrinsic motivation (Amabile, Hill, Hennessey, & Tighe, 1994), task significance (Hackman & Oldham, 1976), job and work involvement (Kanungo, 1982), and professional identity (Ibarra, 1999), within the last decade, careers scholars have again begun advocating paying attention to *both* extrinsic and intrinsic career characteristics (Hall & Chandler, 2005; Heslin, 2005; Ng et al., 2005). Nonetheless, as a result of the early research emphasis on extrinsic aspects of careers and relative neglect of the intrinsic aspects, little is known about how people make career-pursuit decisions when these aspects are misaligned. When career contexts do not allow for the “ideal” of maximizing positive outcomes both extrinsically and intrinsically, a significant dilemma emerges for people considering embarking on this career path: should they pursue a career they are likely to find highly intrinsically rewarding but not extrinsically rewarding (or vice versa)?

In this study, we examine how people make career-pursuit decisions in contexts in which the career's intrinsic and extrinsic opportunities might clash, specifically, the career path to become a professional musician. We posit that a key factor in resolving this dilemma is the sense of *calling*, defined as the “consuming, meaningful passion people experience toward a domain” (Dobrow & Tosti-Kharas, 2011, p. 1003). We hypothesize that those who experience strong

² This pattern is consistent with career research conducted by economists. This work typically focuses on calculations of utility, chances of success, or expected salary, thereby suggesting people's rational course of action is to pursue careers that maximize positive outcomes in terms of extrinsic rewards (e.g., Holmström, 1999).

callings toward a domain as adolescents will prioritize their emphasis on the intrinsic aspects of their career over the extrinsic aspects by pursuing a professional career in this domain as adults. We also investigate *how* calling triggers this career pursuit. We propose a causal sequence in which calling leads to career pursuit via two types of ability in the calling domain – ability as seen from (a) the perspective of the individual (“perceived ability”) and (b) the perspective of expert judges (“actual ability”) – as they occur during early adulthood (see Figure 1). That is, calling may either distort people’s perceptions of their abilities and, consequently, their beliefs about their chances of success in the domain or it may enhance people’s effort and practice leading to improvement in the domain (as rated by experts in the field). We also test for the reverse-causal sequence, namely that people’s abilities in a domain as adolescents influence their calling as young adults, which ultimately drives career pursuit as adults. We test our hypotheses in an 11-year, five-wave longitudinal study of a sample of 450 amateur high-school musicians progressing from adolescence to adulthood.

Insert Figure 1 about here

Theoretical Background

Calling and Career Pursuit

Calling is a *consuming, meaningful passion people experience toward a domain* (Dobrow & Tosti-Kharas, 2011). In this view, calling is subjective and internal, continuous rather than binary (i.e., it exists in degrees, rather than “having” or “not having” a calling) and exists in relation to external non-work or work domains. Further, it is relatively stable over time (correlations ranging from .83-.86 over six weeks to .38 over 7 years in Dobrow & Tosti-Kharas, 2011), yet also can change substantively (Dobrow, 2013). Recent research is also establishing the nomological network around this relatively new construct. This largely cross-sectional research

has primarily documented positive correlations between calling and subjective constructs such as life and job satisfaction (Duffy, Bott, Allan, Torrey, & Dik, 2012; Peterson, Park, Hall, & Seligman, 2009; Wrzesniewski, McCauley, Rozin, & Schwartz, 1997), intrinsic motivation, work engagement, job involvement (Dobrow & Tosti-Kharas, 2011), zest (Peterson et al., 2009), and well-being (Duffy, Manuel, Borges, & Bott, 2011).

Calling is also positively related to several career constructs, including career-related self-efficacy, clarity of professional identity, career insight (Dobrow & Tosti-Kharas, 2011), and a set of career development variables (e.g., decidedness, comfort, self clarity and choice-work salience in Duffy & Sedlacek, 2007; Hunter, Dik, & Banning, 2010). Calling is a related yet distinct construct, both empirically and conceptually, from Wrzesniewski et al.'s (1997) career orientation measure ($r_s = .22, .31, .28$, and $.43$ in Samples 1 through 4; Dobrow & Tosti-Kharas, 2011), which captures the meaning of work people derive from obtaining power or prestige, from advancing through a job hierarchy, and from the challenge of the work itself (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1985; Wrzesniewski et al., 1997).

Although many scholars view calling as playing an important role in people's careers, research evidence connecting callings with actual career pursuit is limited. Indeed, although several scholars recommend investigating the outcomes of calling or the mechanisms underlying the connection between calling and outcomes (e.g, Bunderson & Thompson, 2009; Dik & Duffy, 2009; Dobrow, 2013), there is a paucity of studies in this area. Further, because most calling research has used cross-sectional methodologies (e.g., Berg, Grant, & Johnson, 2010; Bunderson & Thompson, 2009; Duffy, Allan, & Dik, 2011), whether calling leads to occupational choice or occupational choice leads to calling via such mechanisms as reducing cognitive dissonance (Vroom, 1966) or fostering retrospective rationalization (London, 1983) is unknown.

This review shows extant calling research has primarily focused on positive relationships. However, scholars have recently begun to consider that callings might be a “double-edged sword” – that is, callings can have both positive *and* negative implications, including that those with strong callings may be exploited by management (Bunderson & Thompson, 2009), may experience tension between personal and social identities in challenging occupations (Kreiner, Hollensbe, & Sheep, 2006), may suffer strain in their personal and professional relationships as a result of their high degree of focus on work (Cardador & Caza, 2012), and are more likely to ignore potentially useful but discouraging career advice (Dobrow & Tosti-Kharas, 2012). Extending this notion of a double-edged sword, we make the novel case that callings play a particularly critical role in the context of *challenging* career path pursuit. An exemplar of this context is winner-take-all markets, in which too many contestants attempt to compete, leading to a glut of people and a resultant lack of employment for most in the market (Frank & Cook, 1995). In this setting, in which individuals can perceive a tension between attaining intrinsic rewards at the potential expense of extrinsic rewards, we predict that people with strong callings will prioritize the intrinsic benefits of their careers over the extrinsic.

The Current Investigation

We seek to shed light on the important role early callings play in leading to career behaviors in a context in which the prospects of attaining both intrinsic and extrinsic rewards in one’s career clash. We do so by examining the prospective predictive power of calling on actual career pursuit several years later within a challenging career domain. We conduct our research in an “unconventional” (Bamberger & Pratt, 2010), “extreme” (Eisenhardt, 1989) career domain, professional music, in which extrinsic career considerations may point to *not* pursuing a career in this domain (Frank & Cook, 1995; Rosen, 1981). Labor market statistics as well as economic

downturns that negatively impact arts organizations highlight the difficult nature of this career path (U.S. Department of Labor, 2014-15). Large numbers of people compete for a small number of positions “at the top” of the hierarchy, often with a concentration of rewards reaped by the winners in this type of “winner-take-all” labor market (Frank & Cook, 1995). By graduation, only 10% to 15% of students at even the most elite U. S. conservatories have found full-time employment in music (Wakin, 2004). Moreover, the New York Times reported that by 10 years after graduation, over 30% of Juilliard graduates from the class of 1994 had left professional music altogether, sometimes selling their valuable musical instruments to make ends meet (Wakin, 2004). Musicians who manage to find professional music employment earn lower salaries than other professional occupations and are far more likely to hold secondary jobs outside their primary occupation (National Endowment for the Arts, 2004). Yet on the intrinsic side, professional musicians are viewed as exemplars of those who can attain particularly positive outcomes , such as high levels of meaning and satisfaction (Hall & Chandler, 2005). Thus music careers truly pit the extrinsic and intrinsic sides of the career against one another, creating a significant career-pursuit dilemma for young musicians.

Our participants were amateur musicians who advanced from about 17 to 28 years old during our longitudinal study’s timeframe. This context allowed us to obtain a real-time view of the impact of early callings experienced during adolescence on actual career pursuit during adulthood. To ensure we examine calling’s unique role in predicting career pursuit, we explore this relationship above and beyond the effects of other potential early predictors. Drawing on the theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975), we focus on early actual and perceived abilities as proxies for behavior control, as these are important factors that may influence the actual and perceived control of music career pursuit behaviors (Armitage &

Conner, 2001). We also focus on the external pressure individuals may experience from their parents and teachers (i.e., subjective norms). Furthermore, we test for the underlying mechanism in the calling-career-pursuit relationship, namely, perceived and actual ability as young adults. That is, we examine the psychology of those with stronger (versus weaker) callings in resolving the dilemma of making career-pursuit decisions in contexts in which attaining intrinsic and extrinsic rewards in one's career might clash. We argue that greater perceived and actual ability help steer them toward the objectively challenging music career path as adults.

In defining career pursuit, we follow Hall's (2002) argument that career scholars use the novel "perspective that a career choice is not just the choice of an occupation...but any choice affecting one's career" (pp. 49-50). Thus career pursuit is no longer viewed as a single, finite endpoint, such as the selection of an occupation; rather, it is a dynamic series of multiple points that occur over the course of people's lives (Lent, Brown, & Hackett, 1994). In this spirit, our longitudinal investigation focuses on two important, objective indicators of professional career pursuit in the calling domain. First, consistent with the careers literature's longstanding emphasis on college-related decisions as indicators of career choice, we consider participants' college degree earned (e.g., Hall, 2002); here, specifically, the extent to which this degree was music oriented. Second, we later assess the degree to which our participants work professionally in the calling domain. Earning a degree in a domain is not the same as eventually working professionally in that domain; rather, each reflects important but different steps along the career path. For instance, among arts-degree holders in the United States – including musicians – 46% have occupations outside the arts (SNAAP, 2012).

Consistent with an implicit assumption in the calling literature that people will strive to enact their callings in their careers (e.g., Bunderson & Thompson, 2009; Duffy & Sedlacek,

2007, 2010), we argue that calling will, indeed, play an important role in career pursuit even within challenging career contexts. Initial support for this argument can be found in cross-sectional research on zookeepers showing that many of them simultaneously experience strong callings toward their work yet also face an objectively challenging occupational context, in which they are poorly paid relative to their education level, have limited opportunities for advancement and status, and regularly engage in “dirty” and even dangerous work (Bunderson & Thompson, 2009). However, it is currently unknown whether and how strong early callings lead to later career choices that emphasize the intrinsic side of the career over the extrinsic.

We reason that because calling inherently involves a consuming, meaningful passion toward a domain, high levels of it exert an internal motivational force on the person toward this domain (e.g., Fishbein & Ajzen, 1975). For instance, qualitative research indicates that when individuals cannot actually work in jobs that fulfill their callings, their desire to fulfill these callings is so strong they engage in job-crafting techniques to pursue their callings in their existing jobs (Berg et al., 2010). Furthermore, as we outline below, we argue that the positive relationship between calling and career pursuit travels through enhanced perceived and actual ability. Nevertheless, in spite of the literature’s assumptions about calling’s motivational strength, researchers have not empirically established the connection between individual differences in early calling and its prospective enactment in careers in general, and challenging ones in particular. Thus we hypothesize the following:

Hypothesis 1: The degree of calling toward a domain experienced early in life will positively predict career pursuit in this domain many years later—*above and beyond* the effects of other early predictors (perceived ability, actual ability, and external pressure to pursue this career).

Calling, Perceived Ability, and Actual Ability

How does calling trigger career pursuit? We argue that early calling may psychologically

enable people to pursue a career by influencing their perceived and actual ability. Specifically, we put forth that calling leads to career pursuit via two types of ability in the calling domain – ability as seen from (a) the perspective of the individual (“perceived ability”) and (b) the perspective of expert judges (“actual ability”) – as they occur during early adulthood (i.e., several years post-early calling and several years pre-career behavior).

Regarding the calling-perceived-ability relationship, in particular, an implicit assumption in research on this type of ability is that people hold accurate self-views about their skills and are therefore pragmatic, effective career-decision-makers (Holland, 1997; Lent et al., 1994). Yet research on positive illusions and other cognitive biases suggests people’s career decision-making skills and self-perceptions may not be as reliable as assumed (e.g., Bazerman, 1998). Indeed, people often have overly optimistic self-assessments of their abilities (e.g., Dunning, 2005; Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008; Kruger & Dunning, 1999), especially in domains they view as important (Bazerman, 1998; Sedikides & Gregg, 2008). For example, people are more likely to focus on positive aspects and experiences and to forget negative feedback about themselves, particularly if this feedback is about their involvement in domains important to them (Sedikides & Green, 2000; Sedikides & Gregg, 2008).

Thus we reason that the consuming, meaningful, passionate nature of calling should render as more important those domains toward which callings are oriented. This combination creates the psychological conditions for people to focus on their own beliefs about and experiences in the calling domain (e.g., their passion and desire to engage in the domain) and to deemphasize outside career information (e.g., extremity of the competition, few available positions; Dobrow & Tosti-Kharas, 2012). We therefore posit that stronger callings will encourage self-enhancement processes in the form of higher perceived ability in music over time.

As for the calling-actual-ability relationship, we draw on expectancy theory (Vroom, 1964). We anticipate strong callings will increase the valence of the pursuit of a music career as well as enhance the expectancy that effort in the musical domain will lead to positive outcomes, such that these young musicians will exert effort and show enhanced perseverance in face of obstacles. Although research has not directly investigated the calling-actual ability relationship, initial findings revealing associations between calling and a stronger sense of duty and sacrifice (Bunderson & Thompson, 2009), fewer missed days of work (Wrzesniewski et al., 1997), and increased zest (Peterson et al., 2009) are consistent with this notion that calling can lead to increased effort or perseverance (Ericsson, Krampe, & Tesch-Romer, 1993). This effort and perseverance, in turn, could ultimately improve actual abilities over time as our participants progress from adolescence into young adulthood. In sum, we hypothesize that stronger early callings (relative to lower callings) will lead to greater perceived and actual ability later in time:

Hypothesis 2: The degree of calling toward a domain experienced early in life will be positively associated with perceived ability several years later—*above and beyond* the effects of other early predictors (perceived ability, actual ability, and external pressure to pursue this career).

Hypothesis 3: The degree of calling toward a domain experienced early in life will be positively associated with actual ability several years later—*above and beyond* the effects of other early predictors (perceived ability, actual ability, and external pressure to pursue this career).

Although our theorizing for Hypotheses 2 and 3 focuses on the sequence of early calling leading to later ability, the reverse order – that early ability leads to the development of a later calling toward the domain – is also plausible. In other words, although we reasoned that the domain people love influences how much they excel (or think they excel) in it, ability might also be the driving force behind calling. That is, excelling in a domain may lead to the development of a calling toward the domain (i.e., high early musical ability leads to a later calling toward

music) or perhaps both sequences may be operating simultaneously. To address this competing prediction, we supplement our core analysis with a test of the reverse causal sequence – early high ability in music leading to the development of stronger callings over time.

Mediating Effects of Perceived and Actual Abilities

We posit that perceived and actual ability in a given domain will be mediators between early calling and ultimate career pursuit in that domain. We expect perceived ability to play this role for several reasons. According to the social cognitive theory of career development, a core building block people use to exercise agency in their careers is self-efficacy beliefs about their ability to succeed both subjectively and objectively (Lent et al., 1994). Through a multi-step process involving interest, choice goals, and choice actions, self-efficacy ultimately leads to career-related behaviors. That is, the greater people's beliefs about their ability to accomplish their goals in a given domain, the more likely they are to continue and even increase their involvement in this domain (Lent et al., 1994). Individuals' beliefs about their abilities are “tantamount to a desire to use that skill” and so are reflected in occupational preferences and choices (Vroom, 1964, p. 86). Indeed, self-assessments of abilities can predict positive career outcomes over several years (Braun, Sheikh, & Hannover, 2011). Similarly, Ashford (1989) emphasized the connection between people's self-assessments of their strengths, weaknesses, and past performance with successfully regulating career outcomes. These self-assessments are especially critical during periods of ambiguity, such as during career changes (Ashford, 1989) and in highly competitive domains such as professional music (Frank & Cook, 1995).

Building on this literature regarding the importance of perceived ability in predicting career outcomes, as well as the rationales for Hypotheses 1 and 2, we propose perceived ability mediates the relationship between early calling and later career pursuit, above and beyond their

contemporaneous actual ability. That is, we posit that the stronger the sense of calling experienced by musicians during adolescence, the greater their perceived ability will be as young adults, regardless of their actual ability at that same time. Given this high level of perceived ability, these individuals believe they will be one of the lucky few to beat the odds and will therefore be more likely to opt to pursue music careers as adults.

We also test for the possibility that actual ability in a domain leads to career pursuit in that domain, beyond the effects of perceived ability. We build on a long tradition in vocational psychology research highlighting the importance of congruence between objective skills and career choice (Betz & Rottinghaus, 2006; Campbell, 2002). Building on this logic, as well as the rationales for Hypotheses 1 and 3, we propose actual ability mediates the relationship between early calling during adolescence and career pursuit during adulthood, controlling for their contemporaneous perceived ability. In sum, we suggest that callings may influence career pursuit by shaping how people think about their chances of success, either via their internal beliefs about their capabilities (i.e., perceived ability) or via external observations about their capabilities (i.e., actual ability). To eliminate the potential confounding role of early perceived and early actual abilities, we hypothesize net effects for calling above and beyond these baseline levels of ability and control for their effects when examining the two mediators.

Hypothesis 4: The relationship between degree of calling toward a domain experienced early in life and career pursuit in this domain many years later will be mediated by perceived ability —*above and beyond* the effects of other early (perceived ability, actual ability, and external pressure to pursue this career) and contemporaneous (actual ability) predictors.

Hypothesis 5: The relationship between degree of calling toward a domain experienced early in life and career pursuit in this domain many years later will be mediated by actual ability —*above and beyond* the effects of other early (perceived ability, actual ability, and external pressure to pursue this career) and contemporaneous (perceived ability) predictors.

Method

Sample and Procedure

Participants were 450 students at two premier U.S. high-school summer music programs. These two programs were selective on a national level and offered young musicians four to nine weeks of complete music immersion, which provided a preview of life as a full-time musician (Wanous, 1992), considerable musical training, and the opportunity for social comparison of their musical abilities to peers (Larrick, Burson, & Soll, 2007).

We administered surveys in five waves over the course of 11 years (total number of surveys = 1,607). The first two waves in the study, “Time 1” ($n = 426$) and “Time 2” ($n = 342$), were written surveys completed at the beginning and end of the summer music programs in 2001, respectively. After three and a half years (2004-2005), we contacted individuals who had completed at least one of the surveys and had provided contact information ($n = 450$) to participate online in the next survey (“Time 3,” $n = 306$; response rate = 68%). After another three and a half years (2008), we once again invited all participants who had completed at least one of the previous three surveys and had provided contact information ($n = 410$) to participate in the online survey (“Time 4,” $n = 262$; response rate = 64%). After another four years (2012), we again invited all participants who had completed at least one of the previous surveys and had provided contact information ($n = 409$) to participate in the online survey (“Time 5,” $n = 271$; response rate = 66%). The surveys included measures of calling, perceived ability, actual ability (awards), career-related behaviors relevant to their particular age, and general background. The summer programs provided additional data from their archives about participants’ actual ability (audition ratings). Table 1 displays all variables included in the analyses and the time periods during which they were measured.

Insert Table 1 about here

During Times 1 and 2, participants were *amateur* high-school musicians on the cusp of making their first significant steps toward or away from pursuing music professionally, particularly deciding whether to major in music in college. By Time 3, participants were typically in college. By Time 4, most participants had graduated from college and were in graduate school or working. By Time 5, participants were predominantly working (full or part time). The intervals between data collections were meaningful in that they captured the early career stages when participants transitioned from making tentative choices as adolescents to making more realistic choices as young adults (Ginzberg, 1951; Levinson, Darrow, Klein, Levinson, & McKee, 1978). These intervals enabled a dynamic investigation of the connection between early calling and later career choices, particularly professional-music-career pursuit. Moreover, participants displayed considerable variance in their professional music aspirations (i.e., at the beginning of the study, 50% of study participants intended to pursue music professionally, 14% did not, and the remaining 36% were undecided), which allowed us to fully examine our research question about how people make career-pursuit decisions in contexts in which the prospects of attaining both intrinsic and extrinsic rewards in one's career clash.

We conducted several analyses to assess whether attrition created any effects in our final sample. We categorized participants into three groups: (a) Group 1 consisted of those who completed only early measures (T1 and T2) ($n = 132$); (b) Group 2 consisted of those who completed only early (T1 and T2) and mediator (T3) measures ($n = 40$); and Group 3 consisted of those who completed all measures (i.e., early, mediator, and outcome variables) ($n = 120$). We conducted several ANOVA analyses to test for differences across these three groups. First, we examined whether the basic predictors differed by group (see variables in Step 1, Tables 3a and

3b). Of these eight variables, we found a significant difference for ethnicity only (Group 1 $M = .75$, Group 2 $M = .70$, Group 3 $M = .86$). Second, we tested for differences among the early measures of mediators by group (see variables added in Step 2, Tables 3a and 3b), and we found no significant differences. We then tested for differences in calling (T1 & T2) and again found no significant differences across groups. Lastly, we tested for differences in the mediator variables, limited to those in Groups 2 and 3 (see variables added in Step 4, Tables 3a and 3b). We found no significant differences. In sum, the results of these analyses highlight that the attrition in this sample is not systematic with regard to our focal variables.

Measures

Calling. To measure calling toward the domain of music, we used Dobrow and Tosti-Kharas' (2011) 12-item scale. These authors established the calling scale's construct validity, including showing that it has a unidimensional factor structure, is stable over time, and displays strong convergent, discriminant, and predictive validity in relation to several career-related behavioral, cognitive, and affective outcomes.

We collected this measure three times over 3 ½ years (Times 1, 2 and 3). Participants rated items such as "I am passionate about playing my instrument/singing," "My existence would be much less meaningful without my involvement in music," and "Music is always in my mind in some way" on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). We averaged the items to create the scale (possible range of 1 = *weak calling* to 7 = *strong calling*; $\alpha = .88, .89$, and $.90$ at Times 1 through 3, respectively). Given their temporal proximity (1.5 months) and close association ($r = .83$), and to obtain a robust assessment of participants' early calling, we averaged participants' calling ratings from Times 1 and 2 for use in our analyses.

Career pursuit. We examined two temporally separate objective indicators of

professional pursuit in the calling domain: college degree earned and professional involvement.

College degree earned. Participants earned their college degrees primarily between 2005 and 2008. On the Times 4 and 5 surveys (in 2008 and 2012, respectively), participants provided the name of the college or university from which they earned a degree, their primary affiliation at their college or university, such as a music school within a university, and their major.

Participants who started college but did not earn a degree ($n = 5$) were not categorized for this variable. Otherwise, we coded all available college degree data. Of the 160 participants in our dataset who had complete information for baseline and mediator variables in our model and who completed the T4 and/or T5 surveys – that is, the set of participants who could have provided college degree information – we were able to obtain college degree information from 146 (91%). Based on the information provided by participants, we categorized each college degree earned on a spectrum ranging from most to least music-focused as follows: 5 = *stand-alone music conservatories* (e.g., The Juilliard School); 4 = *conservatory or music school within a university* (e.g., The Eastman School of Music at the University of Rochester); 3 = *music department within a college or university* (e.g., majoring in music performance or music education); 2 = *music and other* (e.g., combined programs between a conservatory and a non-conservatory or double majors between music (non-conservatory) and another field); 1 = *all others* (e.g., anything arts-oriented, non-music, non-arts, other). Because each of the five categories is objective, well-defined, and discrete, it is straightforward to categorize participants' degrees.

Professional involvement. We measured the degree to which participants work in the calling domain, music, professionally with a 4-item scale on the Time 5 survey. In line with other research on the careers of professional performing artists (SNAAP, 2011; Throsby & Zednik, 2011), we focused on the percent income earned from and percent time spent in the

previous year on the two dominant aspects of professional music activity, (1) performing and/or composing and (2) teaching. Participants used the following response scale for each of the four questions, which we converted from a categorical into a numerical variable by using the midpoint of each interval as follows: 0 = *I did not work as a musician/music teacher in 2011*, 10 = *Less than 20%*, 30 = *21% to 40%*, 50 = *41% to 60%*, 70 = *61% to 80%*, and 90 = *81% to 100%*. We computed the average of the four items to generate the scale score ($M = 25.86$, $SD = 23.77$, range 0-85; $\alpha = .76$). An exploratory factor analysis of these four items in which all items loaded onto one factor indicates support for unidimensionality: all items had factor loadings $> .40$ and this factor explained 58% of the variance in items. Thirty percent of the sample earned no money and spent no time on professional music activities.

Perceived ability. We measured participants' assessment of their own abilities in music with a two-item scale that captured their general sense of their musical talent on the Times 1, 2, and 3 surveys. Self-estimate of ability measures typically ask participants to rate their ability relative to a salient, proximal reference group, for instance, to other people the same age (Ackerman, Beier, & Bowen, 2002), other students in their class, or other competitors in the same tournament (Ehrlinger et al., 2008). In line with this previous research, the only salient, proximal reference group in the present study was peers in the same musical specialty at the 2001 summer music program (e.g., others who play the same instrument), to whom participants compared themselves on the Times 1, 2, and 3 surveys. At the summer programs, participants had regular opportunities to observe themselves in relation to their peers, in such settings as orchestra, band and chamber music rehearsals, master classes, practice rooms, and even head-to-head weekly "challenges" for performance assignments at one site.

On the Times 1 and 2 surveys, we asked participants to answer, using a 5-point scale (1 =

much less than others, 5 = much more than others), “Compared to others in your musical specialty (such as players of your same instrument/same voice part) at this festival, how talented are you?” On the Time 3 survey, the instruction wording changed from present to past tense: “Think back to the group of people who were in the same musical specialty as you at [name of summer music program] in 2001 (such as all the other players of your same instrument or same voice part). Please answer the following questions by estimating how you think you would compare to this group of people now.”

In a different survey section, participants rated the item “I believe I have the talent to become a professional musician, regardless of whether I want this career or not” on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). As these two variables had different rating scales, we first standardized (i.e., z-scored) them and then computed their average to create the scale. As with the calling measure, we averaged perceived ability scales from Times 1 and 2 to generate a robust assessment of participants’ early perceived ability. Values on this scale represent an individual’s perceived music ability relative to others in the sample, specifically, the individual’s number of standard deviations above or below the mean (Spearman-Brown = .69 for Times 1 & 2; .75 at Time 3).

Actual ability. We focus on assessing “actual real-life musical achievement” (Kemp, 1996, p. 31) by examining overall actual ability that is meaningful for distinguishing musicians from one another, rather than assessing more specific abilities such as pitch discrimination or chord analysis (e.g., Drake, 1954) and broad abilities such as actual performance (see Helmbold, Rammsayer, & Altenmüller, 2005 for a review) that typically compare musicians and non-musicians. Whereas our perceived ability measure uses participants’ self-ratings by definition, we assessed actual ability using *expert judges’* ratings of participants’ musical talent.

Specifically, we use external assessments by expert judges from the two settings that are the most critical for determining performance and career outcomes in a musical context: awards in competitions and auditions.

Awards. Across domains, awards in competitions are significant to individuals and even to institutional fields (Anand & Watson, 2004). Awards can indicate current actual ability, because ability is typically a key determinant of success in these competitions (Chapman & McCauley, 1993; Shepard, 2010), and predict future success. Indeed, many competitions' purpose is to reward and/or discover "talent" (Musical America, 2012; Shepard, 2010). Winning awards in competitions is highly important in the music domain, in that in "both popular and high art musical genres, competition prizes are staples of promotional media, resumes, and biographies of aspiring and professional musicians alike" (McCormick, 2009, p. 6). Competing for awards may be particularly important for aspiring and early-career musicians, because winning awards – particularly elite national or international competitions – can differentiate extraordinarily talented youth from the general set of gifted and talented youth (Musical America, 2012; Shepard, 2010) and is associated with subsequent career success (Ginsburgh & Ours, 2003). Further, expert judges in music competitions are "able to reliably rank the performance achievement of advanced musicians" ($\alpha = .90$ among 5 judges in Smith, 2004, p. 61), thus suggesting these judges provide reliable ratings.

In line with this existing research on awards, we asked participants, "Have you won any awards in your primary musical specialty? (check all that apply)" (at Times 1, 2, and 3). Consistent with McCormick's (2009) observation about the range of levels of competitions available to musicians, we used geographic level as a proxy for the award's degree of competitiveness and asked participants to select all awards and competitions they had won from

a list ranging from most geographically narrow (i.e., least competitive) to most geographically expansive (i.e., most competitive): school, city-wide/regional, state, national, and international. In our analyses, we utilized the highest-level award won by each participant (“actual ability (awards)”), because it is an objective, clear measure of participants’ maximum level of musical achievement, such that 0 = *none* through 5 = *international*. For instance, participants who indicated they had won both school- and city-level awards are a 2, the value for a city-level award. Participants who indicated they had won all levels of awards are a 5, the value for an international award. Participants reported winning many awards across the geographic levels. At Time 3, 12% of participants had won a maximum award at the school level, 12% city-wide/regional, 31% state, 17% national, and 1% international. Only 27% had not won awards.

Audition ratings. Our second measure of actual ability is one critical for distinguishing musicians from one another: audition ratings (“actual ability (audition ratings)”). The ratings reflect a suite of characteristics, including raw musical talent as well as the ability to perform under pressure in “the most critical gate-keeping activity for determining which musicians gain access to performance opportunities, school admission, employment in music ensembles, and so forth” (Dobrow, 2013, p. 438). Prior to the summer music programs, all applicants completed a live or recorded audition. For both sites, expert judges – typically faculty from the music programs – aimed to ascertain admissibility to the summer program based on overall musical ability. The summer programs did not inform the participants of their audition ratings, but they grant the study authors access to this information in their archives in 2005 (i.e., four years after auditions). We reiterate the research finding that expert musician judges, similar to those involved in the summer program admissions, demonstrate a high level of inter-rater reliability ($\alpha = .90$ among 5 judges in Smith, 2004).

Each of the summer programs used its own audition rating scale. Site 1 used a 5-point scale (1 = *low* to 5 = *high* in .25-point gradations; $M = 3.54$, $SD = .89$; range = 1.50-5.00). Site 2 used a 4-point scale (1 = *Weak, not admissible*, 2 = *Adequate*, 3 = *Good*, 4 = *Exceptional/outstanding*, with plus and minus gradations; $M = 3.24$, $SD = .64$; range = 1.67 (“2-”) – 4.33 (“4+”). These descriptives indicate considerable variance even within this restricted sample, such that almost 25% of accepted students at both sites scored below 3 in their auditions. We standardized across the two sites by z-scoring the ratings within each site, thereby creating an index of the extent to which each participant’s rating was above or below the site’s average. This audition rating measure temporally preceded all our other measures (see Table 1).

Control Variables

We controlled for several socio-demographic and music background variables that could have affected participants’ experience of a calling, their perceived and actual ability, and ultimately career pursuit. Because individuals’ socio-demographic differences could affect calling and, particularly, career outcomes (Judge, Cable, Boudreau, & Bretz Jr., 1995; Ng et al., 2005; Saks & Shore, 2005), we controlled for gender (1 = *female*, 0 = *male*), age (in years at Time 1), and ethnicity (1 = *Caucasian* [84%], 0 = *non-Caucasian* [16%, comprised of African or African-American [3%], Asian or Asian-American [5%], Hispanic/Latino [4%], and Other [4%]). We also controlled for family socioeconomic status, assessed by the question: “How would you characterize your family’s status?” (5 = *Upper class*, 4 = *Upper-middle class*, 3 = *Middle class*, 2 = *Lower-middle class*, 1 = *Lower class*; on the Times 1 and/or 2 surveys). Regarding music background, because participants at the two summer programs could substantively differ from one another, we controlled for participants’ music program site (0 = *Site 1*, 1 = *Site 2*). We also controlled for years of musical experience (at Times 1 and/or 2),

which could be linked to career success (Ng et al., 2005), and type of musical involvement (1 = *instrumentalist*, 0 = *non-instrumentalist*), which is an important determinant of career trajectory in music (U.S. Department of Labor, 2014-15).

As mentioned earlier, we control for the early external pressure participants perceived toward music career pursuit from two potentially significant sources of subjective norms (e.g., social influence and career advice): their parents and their primary music teacher. We asked participants, “What career advice do your parents (primary music teacher) give you?” (at Times 1 and/or 2). We presented them with a list of types of career advice, including “go into music professionally,” and instructed them to indicate whether or not they had received this piece of advice from (a) their parents and (b) their primary music teacher (1 = *yes, received this advice from parents [primary music teacher]*, 0 = *no, did not receive this advice from parents [primary music teacher]*). To represent the proportion of possible external pressures participants received, we computed the average of participants’ two responses about advice received from their parents and primary teachers for use in our analyses (two items total; Spearman-Brown = .68).

Results

Preliminary Analyses

Construct Validation. We used Confirmatory Factor Analysis (CFA) to examine the discriminant and convergent validity of the constructs in our measurement model. We first compared a three-factor model including measures of early calling (T1 & T2), both types of ability together (i.e., actual ability (audition ratings) from pre-T1; actual ability (awards) from T1 & T2 and T3; and perceived ability from T1 & T2 and T3), and both types of career pursuit together (from T4/T5 or T5) ($\chi^2(12) = 40.53, p < .01$, CFI = .89, RMSEA = .10) to a one-factor model in which all measures indicated the same latent construct ($\chi^2(15) = 51.54, p < .00$, CFI =

.84, RMSEA = .12), and found that it was a significantly better fit ($\Delta\chi^2(3) = 11.02, p = .01$). We then expanded the three-factor model into a five-factor model by separating the two types of ability and the two types of career pursuit, such that the factors correspond to the elements depicted in our theoretical model in Figure 1: (1) early calling (T1 & T2), (2) perceived ability (T1 & T2 and T3), (3) actual ability (audition ratings from pre-T1; awards from T1 & T2 and T3), (4) college degree earned (T4/T5), (5) professional involvement (T5). This model fits the data reasonably well ($\chi^2(5) = 25.04, p < .05$, CFI = .94, RMSEA = .09), based on the acceptable fit evidenced by the CFI being above the typical cutoff of .90 and the RMSEA falling in the .08-.10 range (Bentler, 1990; Browne & Cudeck, 1992; Hu & Bentler, 1999), and significantly better than both the three-factor ($\Delta\chi^2(7) = 15.49, p < .05$) and one-factor models ($\Delta\chi^2(10) = 26.51, p < .01$). Thus we conclude the five-factor model best describes our data. In this model, we found that all measures loaded onto their hypothesized factors with loadings ranging from .48 - .77 ($M = .65, SD = .11$).

In addition, the correlations among measures provide convergent validity evidence. Early calling is more highly correlated with the other subjective measures in the model, perceived ability ($r_s = .32$ and $.26, p_s < .01$, with T1 & T2 and T3, respectively), relative to the actual-ability measures ($r = .20, p < .05$ and $r = .13, ns$ for awards T1 & T2 and T3, respectively, and $r = .14, ns$ for audition ratings), and with career pursuit ($r = .33, p < .01$ with college degree earned and $r = .22, p < .05$ with professional involvement). Similarly, the three actual-ability measures' highest correlations are with their most content-similar measures, perceived ability (T1 & T2) (r_s range from .26-.41, $p_s < .01$) and perceived ability (T3) (r_s range from .24-.26, $p_s < .01$), relative to their correlations with early calling ($r = .20, p < .05$ for awards (T1 & T2); $r_s = .13$ and $.14, ns$ for other actual ability measures) or with career pursuit ($r = .22, p < .05$ for actual ability

(awards) (T3) and professional involvement; other r s range from $-.03$ to $.16$, ns).

Test of Basic Assumption. Our research was motivated in part by the basic assumption that professional musicians face challenges in obtaining extrinsic rewards in their careers. We verified this assumption in our data. Comparing participants who have made it into the professional ranks at any level to those who are not in music (i.e., those who score greater than zero versus zero on the professional involvement measure at T5; see details below), the professionally-involved musicians earn \$12,000 per year less on average, are less satisfied with their pay, are more likely to be employed part time (rather than full time), and are more likely to be working in a freelance capacity (based on measures collected on the Time 5 survey; all p s $< .01$). Nonetheless, we also find that the professionally-involved musicians experience marginally higher general job satisfaction at Time 5 ($M = 5.42$, $SD = 1.46$, on a 7-point scale) than those not in music ($M = 5.09$, $SD = 1.51$), $t(252) = -1.76$, $p = .08$; marginally higher life satisfaction at Time 4 (on a 7-point scale, $M = 5.04$, $SD = 1.09$ for professionally-involved musicians versus $M = 4.72$, $SD = 1.32$ for those not in music), $t(191) = -1.82$, $p = .07$; and equal levels of life satisfaction at Time 5, $t(258) = -1.00$, $p = .32$.

Descriptives. Table 2 reports descriptive statistics and correlations for all variables. Consistent with Hypothesis 1, early calling was positively related to both indicators of music-career pursuit up to 10 years later ($r = .33$ and $r = .22$ for college degree earned and professional involvement, respectively, both p s $< .01$). In line with Hypothesis 2, early calling showed a positive correlation with perceived ability at Time 3 ($r = .35$, $p < .01$) but no significant correlation with actual ability (awards) at Time 3 ($r = .13$, ns). We also found a positive association between perceived ability at Time 3 and the two indicators of career pursuit ($r = .44$ and $r = .47$ for college degree earned and professional involvement, respectively, both p s $< .01$)

and between actual ability (awards) at Time 3 and one indicator of career pursuit, professional involvement ($r = .22, p < .05$). These correlations suggest a mediation path between early calling and later career pursuit through perceived ability (Hypothesis 4), but provide less evidence for a mediation path through actual ability (Hypothesis 5). Early calling and perceived ability (early and Time 3) were more highly correlated with both indicators of music-career pursuit than the objective music-ability measures were—or any other variables in the analyses. These findings provide initial evidence that subjective perceptions and experiences—more so than talent—are major drivers of participants' career choices.

Insert Table 2 about here

Hypotheses Testing

Our models are prospective longitudinal models in which we drew core variables from temporally distinct and meaningful time periods. We tested our hypotheses using two different types of hierarchical analyses: ordinal logit regression for the ordinal-scale outcome (college degree earned) and standard multiple regressions for the continuous outcome. Step 1 is the base model, comprised of basic control variables only. In Step 2, we added early assessments of the mediators as exogenous controls (i.e., perceived ability (T1 & T2); actual ability (awards; T1 & T2) and actual ability (audition ratings)). All models included the same set of control variables in Steps 1 and 2. Early calling, our focal predictor, entered the model in Step 3. Lastly, we added the mediators in Step 4. We estimated these models using listwise deletion, such that we only included those cases in which complete information was available (i.e., across all hypotheses for each outcome variable). We tested the mediation predicted in Hypotheses 4 and 5 using the steps recommended by Baron and Kenny (1986), as well as via the indirect-effects test based on a bootstrapping method (Preacher & Hayes, 2008).

Supporting Hypothesis 1, the hierarchical ordinal logit regression analyses indicate a positive association between early calling and college degree earned several years later, controlling for early perceived ability, early actual ability (awards and audition ratings), early external pressure, and other individual characteristics ($\beta = .70^3$, $p < .001$; see Table 3a, Step 3). Lending further support to Hypothesis 1, the hierarchical regression analyses indicate a positive association between early calling and the second career pursuit indicator (professional involvement) 10 years later, controlling for early perceived ability, early actual ability (awards and audition ratings), early external pressure, and other individual characteristics (standardized $\beta = .21$, $p < .05$; see Table 3b, Step 3).

In support of Hypothesis 2, early calling was positively associated with perceived ability three and a half years later, controlling for early perceived ability, early actual ability (awards and audition ratings), early external pressure, and other individual characteristics (standardized $\beta = .19$, $p < .05$; see Table 4, Step 3). Our results did not support Hypothesis 3, that early calling would be positively associated with actual ability (awards) several years later, controlling for early perceived ability, early actual ability (awards and audition ratings), early external pressure, and other individual characteristics (standardized $\beta = -.01$, *ns*; see Table 5, Step 3).

As mentioned earlier, we tested our mediation hypotheses (H4 and H5) using two approaches: the traditional four-step approach (Baron & Kenny, 1986; MacKinnon, Fairchild, & Fritz, 2007) and indirect effects analysis (Preacher & Hayes, 2008). First, using Baron and

³ Parameter estimates in an ordinal logit regression model are odds estimates. In the present analyses, the parameter estimates for each predictor indicate the odds of increasing one notch on the outcome variable (e.g., from 1 to 2 or 2 to 3), controlling for the other predictors in the model. To interpret parameter estimates in this type of model, we first converted the parameter estimates from logit form to odds form by calculating e^{β_i} , where β_i represents the i th parameter estimate. For example, the parameter estimate for early calling in Table 3a, Step 3 is .70, and so $e^{.70}$ equals 2.01. The interpretation of this odds estimate for a continuous predictor (e.g., calling) is: for each one point of increase on the calling scale, participants have 2.01 the odds of earning a college degree one notch higher on the college-degree-earned scale.

Kenny's (1986) method, we established early calling was associated with the outcomes, the two indicators of music-career pursuit (Hypothesis 1). Second, our results showed early calling related significantly to perceived ability (Hypothesis 2), but not to actual ability (awards) (Hypothesis 3). Third, in our full models, perceived ability was positively related to both indicators of music-career pursuit (the outcomes), controlling for early calling ($\beta = 1.04, p < .001$ for college degree earned; see Table 3a, Step 4; and standardized $\beta = .48, p < .001$ for professional involvement; see Table 3b, Step 4). The second proposed mediator, actual ability (awards), was not related to either indicator of music-career pursuit. Finally, the relationship between early calling and college degree earned decreased from .70 ($p < .001$) to .55 ($p < .05$), and the relationship between early calling and professional involvement decreased from .21 ($p < .05$) to .12 (*ns*) (see Table 3b, Steps 3 vs. 4) when controlling for perceived ability and actual ability (awards) (see Table 3a and 3b, Steps 3 vs. 4, respectively). Thus the first three steps of the test for mediation were fulfilled for perceived ability. The fourth step revealed a decrease in the effect of early calling on both outcome variables (but not to zero for college degree earned) indicative of partial and full mediation for college degree earned and professional involvement, respectively. Actual ability (awards) is not a mediator for either indicator of career pursuit.

We supplemented our mediation test with indirect-effects tests using the bootstrapping approach (Preacher & Hayes, 2008). We tested the two mediators simultaneously, which allows us to discern (a) whether each mediator has an indirect effect above and beyond the other mediator and (b) whether the two indirect effects significantly differ from one another (Preacher & Hayes, 2004). Our analyses show perceived ability has a significant indirect effect on the relationship between early calling and both indicators of music-career pursuit, because the 95% confidence intervals do not include zero (95% bias corrected and accelerated confidence interval

of .03 to .27 for college degree earned and .40 to 6.02 for professional involvement). Actual ability (awards) does not have a significant indirect effect on either music-career pursuit variable (i.e., the 95% confidence intervals include zero for both indicators of music-career pursuit). Further, the 95% confidence interval for the contrast between the two proposed mediators is significant (.03 to .28 for college degree earned and .21 to 6.16 for professional involvement), which means the magnitude of perceived ability's indirect effect is significantly larger than actual ability's (awards) indirect effect.

To summarize, both approaches for testing mediation converge to support our hypothesis that perceived ability mediates the relationship between early calling and music-career pursuit.⁴ Actual ability (awards) does not mediate this relationship.⁵

Insert Tables 3a, 3b, 4, and 5 about here

Synthesis and Interpretation

To interpret the results of our full mediation model (Table 3b, Step 4), and particularly the effects of early calling, we calculated predicted values of music-career pursuit (professional involvement) across different levels of early calling, ranging from 3 to 7 on a 7-point scale (because the range in our sample was 2.92-7). We focus here on the professional involvement outcome variable, as the linear regression models used to generate these results provide more straightforward interpretation than do the ordinal logit regression results for the college degree earned measure. We held all other variables in the model constant at their sample means.

⁴ For both career-pursuit-outcome variables, we also tested Steps 3 and 4 of the models without including any controls (i.e., the variables entered in Steps 1 and 2). These results were identical to the models including all controls, such that both approaches for testing mediation again converge to support our hypothesis that perceived ability mediates the relationship between early calling and music-career pursuit. These analyses indicate our core results are not due to false-positive suppression effects (Simmons, Nelson, & Simonsohn, 2011).

⁵ For both career-pursuit-outcome variables, we tested alternative full models in which we tested both actual ability (audition ratings) and perceived ability as potential mediators and early perceived and early actual ability (awards) as covariates. We found the same pattern of results as in our core analyses: perceived ability mediates the relationship between early calling and music-career pursuit, but actual other-perceived ability does not. We thank the Associate Editor for this helpful suggestion.

Participants at the lower (3) end of the calling spectrum at Time 1 are predicted to earn less money and spend less time on professional music 10 years later relative to participants at the higher (7) end of the calling spectrum ($\hat{Y} = 17\%$ vs. $\hat{Y} = 31\%$, respectively). That is, stronger-calling participants' professional involvement in music is almost double weaker-calling participants'. These predicted values portray the impact of early calling on pursuing a professional music career over the multi-year timeframe for participants with the *same early and Time 3 levels of perceived and actual abilities* (i.e., set at the sample mean). Put simply, people experiencing stronger early callings are much more likely to earn money from and spend time on professional music—above and beyond the effects of both their perceived and actual abilities.

Alternative Account

As mentioned earlier, an alternative plausible model is that early higher perceived ability leads to later stronger callings. Thus to untangle the direction of causality between calling and perceived ability, we tested for reverse causality in the calling-perceived-ability relationship using cross-lagged panel analyses (following methods described in Salamon & Robinson, 2008; Shingles, 1985) that compared the results of two regressions: one that predicted *calling at Time 3* from early calling and perceived ability, and another that predicted *perceived ability at Time 3* from early calling and perceived ability (i.e., our model for Hypothesis 2). Both models included the two focal predictors and the set of control variables included in Steps 1 and 2 of our focal analyses (see Table 6). Our analyses show early calling was related to perceived ability at Time 3, controlling for early perceived ability (standardized $\beta = .20$, $p < .05$). By contrast, early perceived ability did not relate to calling at Time 3, controlling for early calling (standardized $\beta = .12$, *ns*). That the relationship from early calling to later perceived ability is stronger than the reverse relationship supports the hypothesized direction that early calling leads to later perceived

ability rather than vice versa.

Insert Table 6 about here

Discussion

In an 11-year, five-wave longitudinal study spanning a critical time period for career decision making in young musicians' lives, we addressed the question of how people make career-pursuit decisions in a context that provides positive opportunities for developing the intrinsic side of one's career, but poses serious challenges on the extrinsic side. We argued and found that a sense of calling during adolescence is a key factor in resolving this dilemma, such that it tilts the balance toward the intrinsic characteristics of one's career. Specifically, we found that individuals with stronger callings toward music during adolescence were more likely to later earn a college music degree and be professionally involved in music as adults even after controlling for early actual and perceived ability levels, and pressure from parents and teachers.

We further demonstrated that perceived, but not actual, ability during young adulthood mediated the relationship between calling during adolescence and career pursuit during adulthood. That is, regardless of their actual musical ability, people with stronger early callings were likely to perceive their abilities more favorably several years later and, consequently, were more likely to pursue music professionally. These findings offer contributions to theory and research on calling and career decision making.

Theoretical and Empirical Contributions

An important contribution of this research is the demonstration of calling's unique power in prospectively predicting actual career pursuit up to 10 years later, beyond other potentially important early predictors such as early actual or perceived ability or social pressures. This is true even in contexts in which the opportunities for success in terms of extrinsic rewards are low

given the winner-takes-all nature of the occupational labor market. These results thus show how callings lead to people prioritizing intrinsic over extrinsic factors in making career-pursuit decisions (see also Bunderson & Thompson, 2009). Although extant calling research relies on the notion that callings can be important in people's careers, empirical investigations have typically examined calling toward a domain and career pursuit simultaneously (e.g., Bunderson & Thompson, 2009; Duffy, Allan, et al., 2011; Wrzesniewski et al., 1997). We thus extend this research by examining how early callings toward a domain are related to career pursuit over long amounts of time, controlling for various potential confounds, thus highlighting the long-term nature and impact of callings even within challenging fields such as music.

This study makes its second contribution by showing a key mechanism, perceived ability, that connects early calling and later career pursuit. This finding provides insight into how perceived ability can help resolve the dilemma of overcoming possible misalignment between the intrinsic and extrinsic sides of careers in the career decision-making process, as is the case for aspiring professional musicians. Participants experiencing a stronger early calling toward the music domain perceived their music abilities as being greater several years later, which ultimately led to a higher likelihood of pursuing a career in this challenging domain – regardless of their actual ability level. Calling thus appears to affect people's cognitions, such that its very nature may lead people to prioritize their own perceptions, even over objective external information about their abilities (c.f., Dobrow & Tosti-Kharas, 2012; see also recent consumer research indicating subjective knowledge plays a more important role than objective knowledge in decision-making, here, risky investment decisions, Hadar, Sood, & Fox, 2013). Further, that people are generally unable to improve their self-assessments, even when motivated to do so (Ehrlinger et al., 2008), underscores the potential persistence of the calling–perceived-ability link

in leading to career behaviors. Once this relationship is set in motion early in life, objective factors may have difficulty intervening. This process sheds light on why people might embark as well as persevere on challenging career paths.

Our research thus advances the calling literature by demonstrating longitudinally that it leads to behavioral career-pursuit outcomes via a subjective cognitive mechanism, perceived ability. However, we acknowledge that additional mediators may connect calling to career pursuit. That said, in our dataset, we explored whether intermediate factors related to participants' college choices mediated this link, but none was significant. Specifically, we looked at participants' college-application-acceptance ratio (number of acceptances/total number of schools to which participants applied) and the selectivity of the college they attended as both possible mediators and as controls for our full mediation models, and we found neither affected our results. Nevertheless, future research should examine additional mechanisms that link calling to career pursuit, with a focus on additional motivational or behavioral factors.

This study's third contribution is that it sheds light on the question of whether people make early career choices based on passions and interests (i.e., their early callings) versus talent (i.e., their early perceived or actual abilities). We find that early callings drive these early career choices, thus showing that participants prioritized the pursuit of their calling over any other factor, including talent or the likelihood of employment, in making their career decisions. This may strike some as objectively irrational risk-taking within a field with low chances of obtaining a job (U.S. Department of Labor, 2014-15). However, our findings reveal a more nuanced picture: strong callings toward music are actually associated with obtaining higher levels of employment in music. That is, in high-attrition occupational career paths such as music, individuals with strong callings are substantially more likely to "make it" in music (i.e., earn a

degree in music or be professionally involved in music) than those with lower callings. Whereas these individuals demonstrate extraordinary levels of persistence about this pursuit, those with weaker callings typically take themselves out or are taken out of the running in such challenging labor market contexts. Thus, ultimately, the conflict between the extrinsic and intrinsic sides of the career may be reduced for those with strong callings in that they are, at least to a degree, able to achieve positive intrinsic and extrinsic outcomes.

Nevertheless, there are difficulties that can go along with the pursuit and eventual fulfillment of a strong calling toward music. As mentioned earlier, participants who made it into the professional ranks at any level (i.e., those who score greater than zero on the professional involvement measure) earn \$12,000 per year less on average, are less satisfied with their pay, are more likely to be employed part time (rather than full time), and are more likely to be working in a freelance capacity than are participants not professionally involved in music, yet also experience equal or marginally higher general job or life satisfaction. Thus, it may also be that for those with strong callings, the extrinsic side matters less than does the intrinsic side or that they have lower goals or apply lower standards to the extrinsic than to the intrinsic side. We call for future research programs to examine a range of outcomes including positive subjective indicators such as well-being (e.g., life satisfaction, as in Heller, Watson, & Ilies, 2004), sense of fulfillment, and vitality alongside objective indicators such as salary and number of promotions, as well as possible dark-side implications of individuals' struggles to persist in enacting callings in challenging career contexts (e.g., feelings of career disappointment or failure, resistance to change, burnout, workaholism, and depression), to develop a more comprehensive understanding of calling's impact on various aspects of careers. We also encourage future research that explores how strong callings affect specific choices within professions. For instance, in music, are strong

callings more likely to lead to a focus on performance over teaching or a higher tolerance for earning a low income within music rather than seeking a higher overall income by working part-time in a non-music job?

Limitations and Future Directions

External validity. A potential limitation of our study was the sole reliance on a talented, adolescent, amateur musician sample, thus raising concerns about the representativeness of our findings. However, this study's findings are important within samples of musicians such as the one used in our study as well as for the music educators and institutions that train and develop them. Furthermore, we expect that callings can help resolve the career dilemmas people face in overcoming misalignment between the intrinsic and extrinsic sides of their careers in other winner-takes-all domains, including other arts fields (e.g., dance, theater, visual arts, and literature), professional sports, and academia.

Further boosting the external validity of the current study, we anticipate that our findings about the connections between calling and career pursuit will generalize to less challenging career domains as well. Building on Wrzesniewski et al.'s (1997) findings that all three work orientations—job, career, and calling—can exist within the same occupation, Dobrow and Tosti-Kharas (2011) found callings can exist across professions, including management and entrepreneurship. Thus we also expect callings can exert their motivational force on career pursuit in diverse career contexts.

Measurement. Our ability measures are limited in several ways. First, the perceived-ability scales include only two items. However, they have adequate reliability (Spearman-Brown = .69 and .75 for perceived ability T1 & T2 and T3, respectively). Second, our actual-ability measures may also be limited. Although winning awards was prevalent in our sample (i.e., 73%

won awards and more competed without winning), we acknowledge the awards measure may be a special case of relatively “high bar” objective information and may not represent all levels or types of objective ability information to which participants might have access. Reliability indices could not be computed for these two measures because the data were not collected. That said, research on expert musician judges similar to those providing data for our study demonstrate a high level of inter-rater reliability ($\alpha = .90$ among 5 judges in Smith, 2004), and both measures nonetheless provide ecologically valid assessments (i.e., audition ratings and awards are primary ways the music profession assesses ability) as well as high face validity.

Additionally, our study would have benefited from having multiple comparable audition measures collected at various timepoints. However, with the exception of the initial audition to gain admission to the summer music programs in 2001, participants did not go through a universal assessment procedure in which they could all be judged by the same standards. Thus our pre-T1 audition rating measure is the only assessment all participants at both sites went through using the exact same audition procedure and rating scale. Further boosting our confidence in our findings, we found the same results as in our core mediation analyses when we ran alternative models using the pre-T1 audition rating as the objective-ability mediator. Finally, the robustness of our mediation findings should be emphasized, in that our findings held even after controlling for several ability measures collected at different points in time. Nonetheless, our study would have benefited from additional micro-behavioral measures such as how much time our participants spent practicing or taking music lessons to explore in greater depth the calling-career pursuit link we proposed.

Another potential limitation of the current study relates to our ability to draw causal inferences regarding the associations between calling, perceived ability, and career pursuit. We

used a prospective longitudinal design spanning a total of 11 years: we measured calling when our participants were in high school (Times 1 and 2), perceived and actual ability three and a half years later during college (Time 3), college degree earned at Times 4 and 5, and professional involvement several years later at Time 5. We also employed several controls to rule out potential confounding variables. Further, our measures were of two different types, subjective (e.g., predictors and mediators, calling and perceived ability, respectively) and objective (e.g., the two concrete behavioral outcomes, college degree earned and professional involvement), and, moreover, came from two separate sources, self-reports (e.g., perceived ability, awards) and archival data (e.g., audition ratings).

This design provides powerful support for our overall theoretical model by focusing on meaningful time periods representing important career milestones: before, during, and after college, when people embarked on their careers. Furthermore, temporally separating the constructs and using multi-method, multi-source data reduces concerns regarding common-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This design also enabled us to explore the direction of causality between early calling and perceived ability during young adulthood by testing both our predicted direction as well as a plausible alternative account. We found support for the hypothesized notion that calling leads to perceived ability rather than the reverse. However, we acknowledge that neither our longitudinal methodology nor analyses can fully establish causality, and that additional research employing experimental designs would be beneficial. Although researchers cannot randomly assign people to “actual” careers, it is possible to experimentally manipulate characteristics of work, including perceived meaning (Ariely, Kamenicab, & Prelec, 2008). Thus, we encourage scholars to explore experimentally the causal connections between calling and a range of outcomes.

Practical Implications

People who experience strong callings toward a domain need to be cognizant of their relative preferences for intrinsic versus extrinsic rewards in their careers and of the potential trade-offs between the two – and then make career decisions accordingly. Making effective career decisions becomes particularly critical when people are faced with economic uncertainty (i.e., when obtaining extrinsic career rewards is especially precarious), as was the case for this study's participants, who were in their early 20s when the 2008 recession began.

Our study highlights a silver lining for those with stronger callings (relative to weaker callings): they are *more likely* to succeed in challenging career contexts, thereby achieving some positive intrinsic and extrinsic career outcomes. Yet because of the nature of winner-take-all markets, there will necessarily be people with strong callings who will not be able to professionally enact their callings. That is, even though in absolute terms, virtually all of our participants experience “strong” callings (e.g., about 90% of our participants report calling levels higher than the mean level of calling reported by people in the business world; Dobrow & Tosti-Kharas, 2011), 39% of our participants were not pursuing music professionally at all and even of those who were, the mean percentage of their income earned from and time spent on professional music was only 22%. For those with the strongest callings in both absolute and relative terms – that is, those one standard deviation above the mean and higher (i.e., calling greater than 6.56, on a 7-point scale) – the mean percentage of their income earned from and time spent on professional music was 32%.

Thus, strong calling individuals in particularly challenging career contexts like music may benefit from considering the pursuit of less challenging career paths while enacting their callings in ways other than as a full-time profession, for instance, as an avocation, a part-time

profession, or one component of a protean career (Hall, 1976). In less challenging career domains, people experiencing strong callings may not need to exercise as much caution. Further, in domains characterized on average by weaker calling levels, people with stronger callings may experience a competitive advantage, such that they are able to experience positives on both the intrinsic and extrinsic sides of their career.

At a societal level, large numbers of strong-calling individuals pursuing objectively challenging career paths might suggest a positive and unexpected implication. Society benefits from the excess of talented people competing for a limited number of positions in winner-take all markets (Frank & Cook, 1995) because the individuals who “win” in this market are exemplary. Furthermore, Frank and Cook (1995) highlighted that people weigh the intrinsic versus extrinsic sides of their careers in labor-market-entry decisions by acknowledging that intrinsic rewards “draw more people into winner-take-all markets than would enter if money were all that mattered” (p. 115). Thus, even though most individuals entering winner-take-all markets eventually “lose” in extrinsic terms by definition, they may still benefit from intrinsic rewards and garner subjective value and well-being, such as the satisfaction derived from attempting to fulfill their calling, even for a limited amount of time.

Conclusion

This study demonstrates that early callings can help resolve career decision-making dilemmas in contexts in which early considerations about the intrinsic and extrinsic sides of the career clash. Early callings enhance perceived ability and thereby enable challenging career pursuit later in life, regardless of people’s actual musical ability. Our results echo a *New York Times* article, which, in reference to classical musicians, suggested that “maybe going to a conservatory is like being a compulsive gambler: It is one big bet, but the drive to study music is

so blinding, and doing anything else so inconceivable, that young players are oblivious to the risk. Sometimes it is hard to determine whether they are driven by single-mindedness or they live in self-denial” (Wakin, 2004). Thus, if attempting to fulfill one’s calling can be so alluring yet also set up potentially challenging career pursuit, should individuals avoid callings entirely or learn to navigate the rough career waters that swirl around them? Our findings reveal an optimistic picture in which those with strong callings are more likely to take the risk, to persist, and ultimately to graduate and get jobs in the calling domain, thereby potentially satisfying their extrinsic and intrinsic career needs. Future research should continue to examine potential trade-offs people make between the extrinsic and intrinsic sides of their careers when making decisions to pursue or not pursue callings, particularly in highly challenging domains. This research should include a broader range of affective, behavioral, and cognitive outcomes, thereby further painting the intricate picture of the calling-career pursuit connection in both its bright and dark colors.

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TABLE 1
Overview of Measures Used in the Analyses

	Source					
	Pre-Time 1	Time 1	Time 2	Time 3	Time 4	Time 5
Variables						
Control Variables						
Music program site (T1/T2)		X ^a	X ^a			
Gender (T1/T2)		X ^a	X ^a			
Ethnicity (T1/T2)		X ^a	X ^a			
Family socioeconomic status (T1/T2)		X ^a	X ^a			
Age (T1/T2)		X ^a	X ^a			
Years of musical experience (T1/T2)		X ^a	X ^a			
Type of musical involvement (dummy) (T1/T2)		X ^a	X ^a			
External pressure from parents and teachers (T1/T2)		X ^a	X ^a			
Perceived ability (T1 & T2)		X ^b	X ^b			
Actual ability (awards) (T1 & T2)		X ^b	X ^b			
Actual ability (audition ratings) (Pre-T1)	X					
Predictor Variables						
Calling (T1 & T2)		X ^b	X ^b			
Mediator Variables						
Perceived ability (T3)				X		
Actual ability (awards) (T3)				X		
Calling (T3)				X		
Outcome Variables						
Music career pursuit -- college degree earned (T4/T5)					X ^c	X ^c
Music career pursuit -- professional involvement (T5)						X
Timing						
Year	2001	2001	2001	2004/2005	2008	2012
Elapsed Time (Since Time 1)	- 3-9 months	0	1.5 months	3.5 years	7 years	11 years

Note. ^aWe collected this time-invariant measure at either/both Times 1 and 2. ^bWe collected this time-varying measure at either/both Times 1 and 2 and averaged to create an "early" measure. ^cWe collected this measure at either/both Times 4 and 5.

TABLE 2
Means, Standard Deviations, and Correlations

	Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9
1.	Music program site (T1/T2)	0.43	0.50									
2.	Gender (T1/T2)	0.69	0.46	-.26 **								
3.	Ethnicity (T1/T2)	0.84	0.37	-.14	.02							
4.	Family socioeconomic status (T1/T2)	3.68	0.70	.02	.12	.17 *						
5.	Age (T1/T2)	17.47	0.88	.14	-.21 *	.07	-.09					
6.	Years of musical experience (T1/T2)	10.44	3.56	.06	.06	.06	.12	.16 *				
7.	Type of musical involvement (dummy) (T1/T2)	0.76	0.43	-.45 **	.04	-.08	.08	-.09	.11			
8.	External pressure from parents and teachers (T1/T2)	0.58	0.43	-.02	-.01	.03	-.11	-.08	.00	-.10		
9.	Perceived ability (T1 & T2)	0.02	0.79	.11	-.27 **	.00	-.03	.12	.03	-.11	.18 *	
10.	Actual ability (awards) (T1 & T2)	2.23	1.33	-.04	-.16	-.01	-.09	.06	.10	.18 *	.02	.41 **
11.	Actual ability (audition ratings) (Pre-T1)	0.10	0.92	.03	-.13	.05	-.03	.19 *	.07	.03	.10	.35 **
12.	Calling (T1 & T2)	5.76	0.83	-.03	-.07	-.01	-.12	.04	-.07	-.18 *	.13	.32 **
13.	Perceived ability (T3)	0.09	0.81	.09	-.13	.07	-.02	.08	.02	-.14	.13	.55 **
14.	Actual ability (awards) (T3)	2.05	1.51	.03	-.09	.12	.20 *	.01	.04	.09	-.01	.26 **
15.	Calling (T3)	5.55	0.88	.03	-.12	-.07	.03	.06	.01	-.09	.16	.21 *
16.	Music career pursuit -- college degree earned (T4/T5)	2.99	1.46	.02	.00	.03	.11	.05	.00	-.04	.21 *	.26 **
17.	Music career pursuit -- professional involvement (T5)	25.86	23.77	-.01	-.02	-.07	.12	.02	.15	.19 *	.14	.25 **

	Variable	10	11	12	13	14	15	16
11.	Actual ability (audition ratings) (Pre-T1)	.25 **						
12.	Calling (T1 & T2)	.20 *	.14					
13.	Perceived ability (T3)	.24 **	.25 **	.35 **				
14.	Actual ability (awards) (T3)	.39 **	.24 **	.13	.26 **			
15.	Calling (T3)	-.01	-.05	.46 **	.41 **	-.08		
16.	Music career pursuit -- college degree earned (T4/T5)	-.03	.16	.33 **	.44 **	.12	.43 **	
17.	Music career pursuit -- professional involvement (T5)	.10	.06	.22 *	.47 **	.22 *	.48 **	.47 **

Note. * $p < .05$. ** $p < .01$. $n = 146$ (i.e., participants included in at least one full model) for all correlations except those with Music career pursuit -- professional involvement (T5), where $n = 121$.

Table 3a

Hierarchical Regression of Music Career Pursuit (College Degree Earned) on Early Calling (Hypotheses 1, 4, and 5)

[illegible]

Table 3b**Hierarchical Regression of Music Career Pursuit (Professional Involvement) on Early Calling (Hypotheses 1, 4, and 5)**

Variable and statistic	Standardized betas			
	Step 1	Step 2	Step 3	Step 4
	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
Step 1. Base model				
Music program site (T1/T2)	.07	.06	.09	.02
Gender (T1/T2)	-.05	.02	.03	.00
Ethnicity (T1/T2)	-.11	-.10	-.09	-.12
Family socioeconomic status (T1/T2)	.12	.10	.12	.10
Age (T1/T2)	.00	.01	.00	.06
Years of musical experience (T1/T2)	.13	.13	.12	.11
Type of musical involvement (dummy) (T1/T2)	.21 ^t	.22 *	.27 *	.26 **
External pressure from parents and teachers (T1/T2)	.17 ^t	.12	.12	.12
Step 2. Early measures of mediators				
Perceived ability (T1 & T2)		.27 *	.19 ^t	-.07
Actual ability (awards) (T1 & T2)		-.02	-.03	-.06
Actual ability (audition ratings) (Pre-T1)		-.07	-.08	-.10
Step 3. Calling (T1 & T2)			.21 *	.12
Step 4. Mediators				
Perceived ability (T3)				.48 ***
Actual ability (awards) (T3)				.13
<i>N</i>	121	121	121	121
<i>F</i>	1.57	1.77 ^t	2.03 *	4.07 ***
<i>df</i>	112	109	108	106
<i>R</i> ²	.10	.15	.18	.35
Adjusted <i>R</i> ²	.04	.07	.09	.26
Change in <i>R</i> ²		.05 ^t	.03 *	.17 ***
Note. ^t <i>p</i> < .10. * <i>p</i> < .05. ** <i>p</i> < .01. *** <i>p</i> < .001.				

TABLE 4

Hierarchical Regression of Perceived Ability: Time 3 on Early Calling (Hypothesis 2)

	Standardized betas					
Variable and statistic	Step 1		Step 2		Step 3	
	B		B		B	
Step 1. Base model						
Music program site (T1/T2)	.11		.09		.12	
Gender (T1/T2)	-.10		.06		.07	
Ethnicity (T1/T2)	.03		.04		.05	
Family socioeconomic status (T1/T2)	.01		-.04		-.03	
Age (T1/T2)	-.06		-.09		-.10	
Years of musical experience (T1/T2)	.06		.03		.03	
Type of musical involvement (dummy) (T1/T2)	-.04		-.03		.02	
External pressure from parents and teachers (T1/T2)	.14		.00		.00	
Step 2. Early measures of mediators						
Perceived ability (T1 & T2)			.57 ***		.51 ***	
Actual ability (awards) (T1 & T2)			-.01		-.02	
Actual ability (audition ratings) (Pre-T1)			.05		.05	
Step 3. Calling (T1 & T2)					.19 *	
N	121		121		121	
F	.86		5.47 ***		5.57 ***	
df	112		109		108	
R ²	.06		.36		.38	
Adjusted R ²	-.01		.29		.31	
Change in R ²			.30 ***		.03 *	
Note.	* p < .05.		*** p < .001.			

TABLE 5

Hierarchical Regression of Actual Ability (Awards): Time 3 on Early Calling (Hypothesis 3)

Variable and statistic	Standardized betas		
	Step 1	Step 2	Step 3
	<i>B</i>	<i>B</i>	<i>B</i>
Step 1. Base model			
Music program site (T1/T2)	.07	.06	.06
Gender (T1/T2)	-.11	-.02	-.02
Ethnicity (T1/T2)	.05	.03	.03
Family socioeconomic status (T1/T2)	.20 *	.24 **	.24 **
Age (T1/T2)	-.03	-.06	-.06
Years of musical experience (T1/T2)	.02	.00	.00
Type of musical involvement (dummy) (T1/T2)	.12	.04	.04
External pressure from parents and teachers (T1/T2)	.01	-.02	-.02
Step 2. Early measures of mediators			
Perceived ability (T1 & T2)		.12	.12
Actual ability (awards) (T1 & T2)		.34 ***	.34 **
Actual ability (audition ratings) (Pre-T1)		.05	.05
Step 3. Calling (T1 & T2)			-.01
<i>N</i>	121	121	121
<i>F</i>	1.03	2.89 *	2.62 *
<i>df</i>	112	109	108
<i>R</i> ²	.07	.23	.23
Adjusted <i>R</i> ²	.00	.15	.14
Change in <i>R</i> ²		.16 ***	.00
<i>Note.</i> * $p < .05$. ** $p < .01$. *** $p < .001$.			

TABLE 6**Testing Direction of Causality: Calling and Perceived Ability**

Variable	Outcome Variable	
	Calling (T3)	Perceived ability (T3)
	<i>B</i>	<i>B</i>
Calling (T1 & T2)	.46 ***	.20 *
Perceived ability (T1 & T2)	.12	.46 ***
R^2	.29	.35

Note. * $p < .05$. *** $p < .001$; Regressions include the same controls as the main analyses; values in table are standardized regression coefficients. (The coefficients for the control variables are available from the authors upon request.). $n = 146$.

FIGURE 1
Theoretical Model

